

Management of a Late Presentation of Bear Mauling with a Complex Maxillofacial Defect in a Tertiary Care Hospital - A Case Report

Jiten Kumar Mishra, Moumita De, Shamendra Anand Sahu, Ripu Daman Arora¹, Manish J Raghani², Nitin M. Nagarkar¹

Departments of Burns and Plastic Sugery, ¹ENT and Head and Neck Surgery and ²Dentistry and Maxillofacial Surgery, All India Institute of Medical Sciences, Raipur, Chhattisgarh, India

Abstract

Rationale: Bear mauling is the most common wild animal-inflicted injury in India. Ideally, these injuries should be managed early with fracture fixation, wound debridement, and appropriate coverage. Delay may lead to devascularization and a more severe deformity, which needs complex and multi-staged procedures for optimal outcome. **Patient Concerns:** Facial deformity in bear mauling is upsetting to the patient. Apart from facial aesthetics, the victim has difficulties in speech, eating, and respiration when the midface is involved. **Diagnosis and Treatment:** Patients require proper assessment of the soft tissue and bony defects by clinical assessment and imaging before planning any reconstruction. **Outcome:** The complex defect was managed in stages by both microsurgical and nonmicrosurgical methods including debridement, fracture fixation, local flaps, free flap, and prosthesis. **Take-away Lessons:** Systematic approach in categorizing each component of the problem, finding the best possible solution for each of them, and inter-departmental collaboration are important.

Keywords: Injuries, maxillary prosthesis, maxillofacial injury, microsurgical free flaps, palatal obturator

INTRODUCTION

Reconstruction of complex maxillofacial defects is challenging. Apart from aesthetic value, the face is the entry passage for the aero-digestive tract. Road traffic accidents, onco-resection defects, and animal attacks are major causes of midfacial defects. Among the wild animal-inflicted injuries, bear mauling is the most common in India.^[1] Bear mauling patients require multiple surgeries, including debridement, flaps, skeletal fixation, and prosthetics for proper rehabilitation.

We describe delayed reconstruction of a significant midfacial deformity in a case of a bear mauling that happened to a young adult male. The patient required multiple debridements, maxillofacial fixation, forehead flap, free osteocutaneous fibula flap, and prosthetic rehabilitation. The patient was discharged with a good functional outcome and satisfactory aesthetic results.

CASE REPORT

The patient presented with a composite defect of the upper and middle third of the nose, difficulty in feeding and speech

with foul-smelling discharge from the nose and poor cosmetic appearance [Figure 1].

Background

The patient sustained midfacial injury following bear mauling in a rural area. After preliminary management at a primary health centre, he was shifted to a multispecialty hospital three days after the injury, where bony fixation of the maxillofacial fractures with forehead flap cover of the nasal defect was done. Following discharge from the facility, he developed dehiscence of the wound over the upper half of the nose with foul-smelling discharge and

Address for correspondence: Dr. Moumita De, Assistant Professor, Department of Burns and Plastic Surgery, All India Institute of Medical Sciences, Raipur, Chhattisgarh- 492099. E-mail: drmoumitade@gmail.com

Received: 06-09-2021

Last Revised: 29-11-2021

Accepted: 06-12-2021

Published: 01-02-2022

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Mishra JK, De M, Sahu SA, Arora RD, Raghani MJ, Nagarkar NM. Management of a late presentation of bear mauling with a complex maxillofacial defect in a tertiary care hospital - A case report. *Ann Maxillofac Surg* 2021;11:359-62.

Access this article online

Quick Response Code:



Website:
www.amsjournal.com

DOI:
10.4103/ams.ams_218_21

loss of distal part of the forehead flap. He was readmitted to the same hospital three months after the primary surgery, where extraction of maggots and wound toileting was done. After that, the patient was referred to our institute for further management.

Computed tomography scan [Figure 1] was suggestive of the following:

- Fracture of nasal bones, maxillary antral walls, medial and inferior orbital wall, zygomatic arch, and hard palate with fixation plates *in situ*
- Absent nasal septum.

After discussion with the ENT and Head and Neck Surgery and Maxillofacial Surgery, the entire premaxilla and major part of the hard palate was removed *en bloc* as a single dead segment along with infected plates and tissues [Figure 2]. Post debridement, the following observations were made and tabularized in Table 1.

After carefully evaluating the pros and cons of each option, the following surgical procedures were performed:

Hard palate and alveolar defect

An obturator was customized for the palatal defect. However, due to the large defect size and absence of canine teeth on either side, fixation and secure retention of the obturator were not achieved. Hence, it was discontinued, and an osteocutaneous free fibula flap was planned. The bony segment was used to reconstruct the alveolar arch. The skin paddle was used to resurface the palatal defect [Figure 3].

The inner lining of the nasal cavity

The proximal viable part of the previous forehead flap was re-elevated and turned over to provide inner lining for the roof of the nasal cavity [Figure 4a].

Outer coverage for the nose

The left side paramedian forehead flap was elevated and transposed to cover the outer skin defect of the upper and mid parts of the nose [Figure 4b].



Figure 1: Preoperative images and computed tomography film

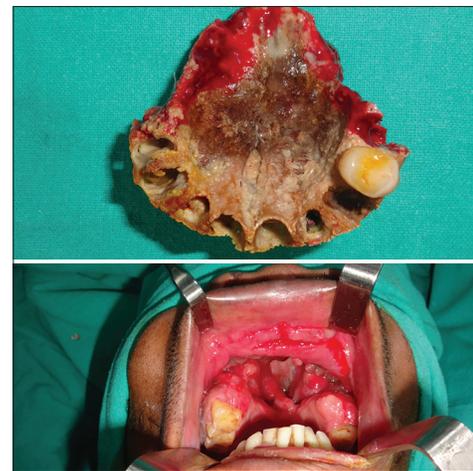


Figure 2: Status post debridement

Table 1: Postdebridement deficits and available options		
Unit absent	Difficulty to patient	Options available
Hard palate	Nasal regurgitation	Obturator Local mucosal, myomucosal or tongue flaps Skin paddle of osteocutaneous fibula
Alveolar arch	Chewing	Obturator Bone segment of osteocutaneous fibula
Inner lining of nasal cavity	Raw area leading to contraction, bleeding, recurrent ulceration	Leave it as raw area Skin graft Turnover of the previously done remaining right forehead flap
Outer lining of nasal defect	Difficulty in breathing	Left forehead flap Free flap reconstruction with RAFF
Nasal septum (cartilage and bony septum)	Saddle nose deformity	Cartilage graft Bony dorsal augmentation
Right lower eyelid ectropion	Incomplete closure of eye	Ectropion release at the time of surgery

RAFF=Radial Artery Forearm Flap



Figure 3: Free fibula osteocutaneous flap forming alveolus and neo-palate

Nasal septum

The wound was deemed not suitable for primary cartilage graft or structural reconstruction of nasal framework. Hence, it was deferred.

Right lower lid ectropion

After release and re-elevation of the previous right-sided forehead flap, the right lower eyelid ectropion got corrected. Postoperatively, the patient had mild residual ectropion; however, he was able to close his eyes.

The postoperative period was uneventful. A nasendoscopy was performed to assess and confirm complete separation of the nasal and oral cavities. The patient had significant improvement in speech and deglutition with no regurgitation of food or liquids.

The forehead flap was divided on day 14 [Figure 4c]. The patient was advised further surgery for reconstruction of the nasal framework, but he declined any further surgery stating his satisfaction with his current appearance [Figure 5]. The entire timeline of the management and surgical procedure is summarized in Table 2.

DISCUSSION

Injury in bear mauling is due to powerful slap with sharp curved claws of the bear, which causes a combination of crushing, penetrating, and cutting injuries.^[2] The most commonly involved injury site is usually the face (80%), followed by the head.^[3] Bear mauling rarely causes death, with a reported incidence of 2.39%. However, the morbidity from maxillofacial injuries is quite significant.^[4]

Soft-tissue laceration is managed by debridement, tissue rearrangement, and suturing. Tissue loss requires loco-regional or free flaps depending on the availability of the tissue and reconstructive needs.^[5]

Maxillofacial fractures are common, ranging from 27% to 95%.^[6] The fractures require open reduction and internal fixation. Reconstruction of palatomaxillary defects requires assessment of the size of the defect and the remaining segment. In the past, management of the maxillectomy defect was to let the defect epithelialize



Figure 4: (a) Forehead flap for lining. (b) Cover. (c) After division



Figure 5: Follow-up

Table 2: Timeline of management			
Deformity/problem addressed	Time since injury	Surgical procedure undertaken	Comments
Maxillofacial fractures, midface soft tissue injuries	3 days	Fracture fixation by miniplates, right paramedian forehead flap cover	Patient discharged after flap division and suture removal 8 weeks after surgery
Wound over the upper nose due to flap necrosis and dehiscence, maggots in the wound	13 weeks	Maggot extraction, debridement of the necrosed flap	Patient was admitted for 4 days and then was attached to OPD for follow-up
Patient was referred to our institute at this stage, 125 days or about 18 weeks after the primary injury			
Dead premaxilla bone with foul-smelling discharge	18 weeks	Tracheostomy, debridement and removal of necrosed premaxillary bones, infected plates and screws under general anaesthesia	Obturator was placed in the immediate postoperative period as the patient was pain free and comfortable. However, due to lack of secure retention, it was discontinued after 2 weeks of trial
Large anterior alveolar defect with oro-nasal communicating cavity	21 weeks	Free fibula osteocutaneous flap for maxillary alveolar arch reconstruction and palatal fistula closure	Well-settled fibula flap achieved adequate palatal closure
Upper and mid-nasal composite defect	27 weeks	Bilateral nasal stenting with endoscopic nasal synechia release with forehead flap cover	Patency was checked in the postoperative period with nasoendoscopy
Forehead flap <i>in situ</i>	29 weeks	Forehead flap division and inset	
Patient was discharged after suture removal; 30 weeks after primary injury			

OPD=Outpatient department

Table 3: Okay's classification of maxillary defects

Class	Description
Class Ia	Defects that involve hard palate but not the tooth-bearing alveolus
Class Ib	Defects that involve any part of the maxillary alveolus and dentition posterior to the canines or involving the premaxilla
Class II	Defects that involve any portion of the tooth-bearing maxillary alveolus but include only 1 canine
Class III	Defects that involved any portion of tooth-bearing maxillary alveolus and includes both canines, total palatotomy defects and anterior transverse palatotomy that involved more than half of the palatal surface
Subclass "F"	Defects that involve the inferior orbital rim
Subclass "Z"	Defects that involved the body of the zygomatic bone

spontaneously or by split skin grafting followed by obturator placement.

Autologous reconstruction is considered superior to prosthetic rehabilitation in maxillary defects in terms of prosthesis stability, patient's quality of life, and functionality. As the size of the defect increases, patient acceptability to the obturator is decreased, the reason being leakage of oral contents into the nasal cavity along with pain and soreness in the mouth. Large maxillary defects are deemed unsuitable for prosthetic rehabilitation, and composite free tissue transfer is preferred.^[7]

Okay *et al.* suggested that palatomaxillary defects involving more than half the palate or the premaxilla and both the canines are poor candidates for a prosthesis. According to their classification [Table 3], the defect in our case was class III, which constitutes a loss of tooth-bearing maxilla with both the canines. They have advocated a surgical reconstruction with an osteofasciocutaneous flap for such defects.^[8]

The forehead flap has long been the workhorse flap for nasal reconstruction.^[9] A staged forehead flap is usually done in two or three stages. A cartilage framework can be inserted in the primary surgery or second stage. Flap thinning and reshaping of the cartilage can be done in subsequent stages.^[10]

In our case, two paramedian forehead flaps were used to reconstruct the nose. Primary cartilage graft was deferred because of the doubtful vascularity of the bed.

The challenge in our case was the delayed presentation. Kar *et al.* reported a 6–30 h delay in primary presentation owing to the remote locations where these injuries take place.^[5] Although mammalian bite wounds in the facial region are relatively resilient to infections due to the rich blood supply of the face, a delay of more than 6–12 h significantly increases the chance of infection and leads to a poorer prognosis.^[3] In our patient, the initial delay of 3 days for proper surgical management played a role in the outcome. Delayed reduction and fixation of the facial fractures might have led to vascular compromise and subsequent bony necrosis.

CONCLUSION

Bear attacks are common in remote areas fringing on the forests, and significant delay occurs before surgical management is undertaken. Delay in fracture fixation and infection may result in ischaemia and necrosis of tissues, as was found in our case. Easier options such as the use of prosthetics may not

be feasible in all cases, and complex staged reconstruction is the only option in such cases. While microsurgical free tissue transfer was the procedure of choice that provided alveolar continuity, projection, and separation of oro-nasal cavities, careful preservation and utilization of whatever local tissue was available played a significant role in the reconstruction.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Bhat TA, Gulzar A, Bhat AA, Bhat TA, Ali Z. A review of upper limb injuries in bear maul victims: Consistent pattern and inverse relation in severity with facial and scalp injuries. *Chin J Traumatol* 2018;21:38-41.
- Vasishta A, Singh M, Kaur G, Gupta S. Bear maul injury in maxillofacial region: A case report. *Traumaxilla* 2019;1:22-5.
- Geetha NT, Shivakumar HR, Amamath PU, Rajesh Kumar BP, Kirthikumar R. Bear maul injuries in maxillofacial region: Our experience. *J Maxillofac Oral Surg* 2012;11:420-4.
- Rasool A, Wani AH, Darzi MA, Zaroo MI, Iqbal S, Bashir SA, *et al.* Incidence and pattern of bear maul injuries in Kashmir. *Injury* 2010;41:116-9.
- Kar IB, Chopda PD, Mishra N, Sethi AK, Mahavoi BR. Management of maxillofacial injuries in bear mauling cases: A review of 20 cases. *J Korean Assoc Oral Maxillofac Surg* 2016;42:13-9.
- Ram R. Maxillofacial Injuries due to Bear Mauling. *J Maxillofac Oral Surg* 2011;10:85-9.
- Klimczak J, Helman S, Kadakia S, Sawhney R, Abraham M, Vest AK, *et al.* Prosthetics in facial reconstruction. *Craniofacial Trauma Reconstr* 2018;11:6-14.
- Okay DJ, Genden E, Buchbinder D, Urken M. Prosthodontic guidelines for surgical reconstruction of the maxilla: A classification system of defects. *J Prosthet Dent* 2001;86:352-63.
- Shokri T, Kadakia S, Saman M, Habal MB, Kohlert S, Sokoya M, *et al.* The paramedian forehead flap for nasal reconstruction: From antiquity to present. *J Craniofac Surg* 2019;30:330-3.
- Menick FJ. A 10-year experience in nasal reconstruction with the three-stage forehead flap. *Plast Reconstr Surg* 2002;109:1839-55.